



Sir Alexander Fleck, K.B.E., F.R.S., in the robes of Doctor of Science of Glasgow University. Sir Alexander retired from the Chairmanship of I.C.I. at the end of last month and is succeeded by Mr. S. P. Chambers

The *I.C.I. Magazine*, price twopence, is published for the interest of all who work in I.C.I., and its contents are contributed largely by people in I.C.I. Edited by Sir Richard Keane, Bt., and printed at The Kynoch Press, Birmingham, it is published every month by Imperial Chemical Industries Limited, Imperial Chemical House, Millbank, London, S.W.1 (Phone: VICToria 4444). The editor is glad to consider articles and photographs for publication, and payment will be made for those accepted.

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Contributors



T. L. Cottrell was appointed Professor of Chemistry at Edinburgh University last autumn. At the time of his appointment he was personal assistant to Sir Ewart Smith. Before that he was head of the Physical Chemistry Section of the Research Department of Nobel Division.



John I. Edwards joined I.C.I. from Cambridge and is a construction engineer at Wilton Works. He took part in the 1955 Cambridge Spitsbergen Expedition and in the ill-fated expedition to the Batura Mustagh region of the Himalayas last year of which he was the sole survivor.



John Ferguson has been Research Director of I.C.I. for the past three years. A Scotsman and a graduate of Glasgow University, he did research there, at Bristol and at Oxford before joining I.C.I. at Billingham as a research chemist just over thirty years ago. Shortly afterwards he moved to Merseyside to the Research Department of the newly formed General Chemicals Division. In the mid-thirties he left research work for a time to concern himself with the design and construction of a group of chemical factories being built by that Division for the Government. Dr. Ferguson became a Director of General Chemicals Division in 1939, and during the war years had a special responsibility for uranium chemical research within I.C.I. for the atom bomb project. Later, he became in succession Research Director of the Alkali Division, Research Director of General Chemicals Division and Joint Managing Director of General Chemicals Division before joining the I.C.I. Board in 1957.



Harold Morris is a pump attendant at the Hillhouse Works of General Chemicals Division.

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SIR ALEXANDER FLECK

A tribute by Mr. S. P. Chambers,
Chairman of I.C.I.

THE retirement on 29th February 1960 of our Chairman, Sir Alexander Fleck, K.B.E., D.Sc., LL.D., F.R.S., is an important milestone in a long and distinguished career. A milestone but not the end of his career, because he will remain hard at work on several important Government tasks which will take a good deal of time and energy.

His story is now well known. First he had a short but distinguished period as a research chemist at Glasgow University, working for a time under another famous scientist, Frederick Soddy. His capacity not only as a chemist but as a man who could surmount difficulties which would have disheartened a smaller man was thus already established when 43 years ago he joined Castner-Kellner Alkali Co. Castner-Kellner's became part of Brunner, Mond & Co. in 1920, and Brunner, Mond became part of I.C.I. when it was formed in 1926, and Dr. Fleck, as he then was, went steadily on and up. In 1931 he became Managing Director of I.C.I.'s General Chemicals Division and in 1937 was appointed Chairman of I.C.I. (Fertilizer and Synthetic Products), which became the Billingham Division of I.C.I.

Dr. Fleck joined the I.C.I. Main Board in 1944 as the Director responsible for Group C, covering the Billingham Division and Central Agricultural Control. It was in that capacity that I first met him when I joined the Board of I.C.I. in June 1947. I have thus had the opportunity of working with him and of appreciating his sterling worth for nearly thirteen years, first when I was Finance Director and he was Group C Director, then for a short period when we were both Deputy Chairmen, and since July 1953 when he became Chairman.

In an organisation as large as I.C.I. with so many brilliant men of one kind or another it is often difficult to say why one of them gets to the top and another does not, but it is not difficult for me, at close quarters, to understand why Sir Alexander Fleck has achieved such an outstanding success and is held in such high esteem. His first love, his interest in everything scientific, has remained with him, but his tremendous energy and enthusiasm have enabled him to apply with great effect the keen, enquiring mind, first recognised in Glasgow, to the wider aspects of the Company's business and indeed of world chemical industry. Moreover—and perhaps this is even more important—Sir Alexander, despite his many responsibilities, has always maintained his close personal interest in the people, whatever their rank, who make up I.C.I. To innumerable employees he has never been a distant figurehead but a really approachable "father of the family." This applies to people overseas as well as to those at home, for Sir Alexander has been a great traveller also, and has frequently visited I.C.I. subsidiary and associated businesses in all parts of the world.

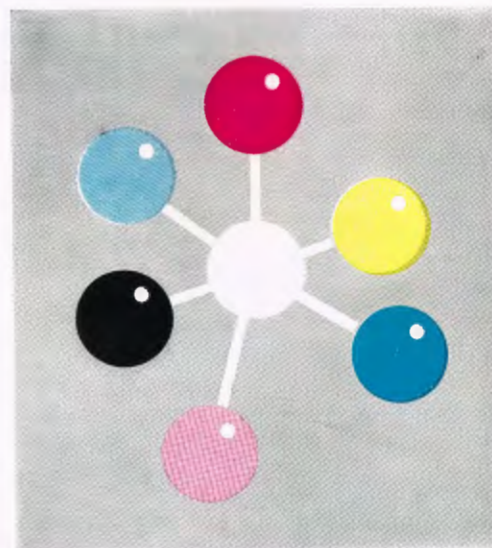
Sir Alexander, I am sure, has had a very happy life in I.C.I. Any man whose intellectual interests go hand in hand with his day-to-day work is likely to be fundamentally a happy and balanced personality for whom added responsibilities are added opportunities of doing what he enjoys doing. That has very much been the character of the Chairman for the whole time I have known him—not only an efficient administrator with a sound judgment but at all times kindly and good-tempered.

Sir Alexander can, I think, also be happy about the state in which he is leaving the Company. During his period as Chairman he has seen the Company grow substantially in size and in prosperity: it is a much larger business than when he joined the Board in 1944, and over the years it has steadily risen in public esteem for its efficiency, its integrity, its sense of public as well as private duty, and its reputation as an employer. Sir Alexander on his retirement goes away knowing full well that his own work and example have contributed to this success and to this reputation in no small measure.

In laying down the office of Chairman which he has filled with such distinction and such success, Sir Alexander will be relieved of the many administrative tasks which are inevitably the lot of the Chairman of I.C.I. and will have more time to read, to think, and to get down to those aspects of science, industry and education which interest him most.

His best-known public work in recent years has been done as Chairman of the Committee of Enquiry into the organisation of the National Coal Board (which reported in 1955) and as Chairman of the three Committees of Enquiry into different aspects of the Windscale Nuclear Power Station breakdown. Of the public work which he will continue to do, I would single out that as Chairman of the Scientific Advisory Committee to the Ministry of Fuel and Power and that as Chairman of the Committee of Enquiry into the fishing industry as examples where his qualities and experience make him a natural choice as the leader.

His friends throughout the world, inside and outside the Company, will wish him well in his retirement and in the work which still lies ahead of him.



PATTERN OF RESEARCH

By John Ferguson (I.C.I. Research Director)

I.C.I. spends £13m. a year on research and related aspects of development. How is this huge programme directed? Here the Research Director reveals the basic principles of the Company's policy.

EDITOR: *Research is a subject that commands a lot of interest these days, particularly when the fruits of research are more and more so clearly with us. Almost every day some fresh item of research news is broadcast, but rarely—if ever—do the people who direct wide ranging programmes of research explain the principles which guide them. Can you help the average person to a better understanding?*

FERGUSON: The first point I would like to make is that modern chemical industry is based ultimately almost entirely on knowledge obtained by scientific research. It is not surprising, therefore, that I.C.I. has always laid great stress on the use of science and on the scientific approach. This attitude is translated into practice by the employment of a staff of over 4000 on research in our many laboratories, by supporting and encouraging pure research in universities and, lastly, by employing scientifically trained people widely throughout the Company in the most varied kinds of jobs.

EDITOR: *Do you draw a sharp distinction between applied research and pure research?*

FERGUSON: Obviously a major distinction between the two lies in a difference of aim. In pure research, knowledge is sought for its own sake and with no immediate practical end in view, although, of course, such knowledge may turn out, sooner or later, to be capable of being applied to useful ends. Applied research, on the other hand, is the deliberate search for useful knowledge, and for methods of utilising old and new knowledge to economic advantage. It is true that the techniques and the thought processes used to solve individual problems in pure and applied science are usually similar; the final objective, however, is different. Often, though certainly not always, the subject matter of applied research is of an entirely different nature from that of pure research—the great difference being that most of the results of applied research do not have that quality of universality characteristic of those which emerge from pure science.

EDITOR: *Then can I take it that I.C.I. carries out only applied research within the organisation?*

FERGUSON: The answer must be "Yes" if you use intention as the distinctive criterion between the two types, because our research must be relevant to our business activities or potential activities. On the other hand, some of our long-range research may, at first sight, seem so removed from immediate practical ends as to be classifiable as pure research, but even here it is at least hoped that some day we shall use the results.

University Research

EDITOR: *Why does I.C.I. support university research? Does the Company hope that results of immediate value to our operations may arise in the universities?*

FERGUSON: No, we do not in general sponsor research at universities on topics of immediate interest to us. We think it best to let the universities go their own way so that science can develop freely according to its own sources of inspiration. Only relatively few of the discoveries made in university laboratories have an immediate and direct impact on chemical industry. Rather is it that the results of university research build up a body of knowledge and principles from which the industry can and does draw sustenance. Taking the long view, therefore, it is right that we should help where we can. Our major contribution, perhaps, has been to encourage university research by the provision of post-graduate research fellowships. No restriction is placed on the holders of these in their choice of subject, so long as it lies within the broad field of chemistry and physics, and related sciences, or engineering.

Of course, there is another very good reason for us helping university research—we recruit technical men from the universities and we want them to have the best possible training; the existence of a flourishing school of research in a university makes it a first-class training ground.

Choice of Targets

EDITOR: *Returning then to I.C.I.'s own applied research effort, we must suppose that there are a large number of targets at which the Company is aiming. Can you say how they are chosen and how we distribute our resources?*

FERGUSON: The targets in the main arise out of the activities of our dozen manufacturing Divisions. If the Divisions are to continue to flourish they must enhance the efficiency of their existing processes and undertake appropriate new manufactures. As econo-

mic conditions change, as new raw materials and new constructional materials become available, and as new methods of control are invented, the scope for improving our existing processes, both by minor and major changes, is always present. Taking I.C.I. as a whole, about 50% of our research and development expenditure is devoted to this end, although the proportion varies a good deal in different Divisions of the Company.

Another 15% of our research and development expenditure is devoted to looking for new products to manufacture, such as new drugs, dyes, insecticides, plastics and so on. Having discovered a product worth making, or having decided to manufacture some substance previously known but not hitherto produced commercially, we have still to carry out research on the best way to make it on the large scale. This accounts for about 20% of our research expenditure.

All this work has to be supported by background research, which provides basic data for our manufacturing processes and which, by the study of scientific principles and by developing scientific instruments, improves the methods employed in our research work.

How we compare with Others

EDITOR: *These are only proportions. What is the actual expenditure, and how does it compare with other sections of the chemical industry and with the total U.K. effort?*

FERGUSON: On research and those parts of our development work closely allied to research we spent in 1959 almost £13 million. Accurate estimates of the total annual expenditure in the United Kingdom on research and development are not too easy to come by, but an estimate for 1955-56 has put the figure at £300 million. Of this the Government spent for its own needs and purposes about £220 million—though it should be noted that more than half of this expenditure was incurred in the research and development departments of private firms working on contract for the Government. Expenditure on research for defence purposes accounted for 80% of the Government's £220 million.

Of the remaining £80 million, about £10 million was spent by universities and similar institutions. So, you see, of the remaining £70 million spent by private industry each year for its own purposes I.C.I.'s £13 million is a substantial contribution, and certainly the largest made by any one company.



Research on tuberculosis in the Pharmaceuticals Division. Cages containing the experimental animals are kept in glass cabinets and can be moved mechanically to the "inoculation hood," entry to which is via rubber gloves. Workers are never in contact with the contaminated air around the animals.

One of the great difficulties in comparing our effort with that of other companies arises from definition of what is included in the phrase "research and development." Another is whether even then we are comparing like with like, since the pattern of manufacture varies from company to company. It is well known that generally a much higher proportion of company income is spent on research in, say, pharmaceutical companies as compared with companies handling heavy-chemical, large-tonnage products. Remembering these uncertainties, we deduce that we

are somewhere in the middle bracket. Curiously enough, it is easier to obtain statistics about the United States than about the British effort: we know, for example, that the average expenditure on research and development in the chemical process industries in the U.S.A. runs at about 4.3% of turnover, i.e. income from sales. This figure is about the same as I.C.I.'s. On the other hand, some of the American giants such as Union Carbide and du Pont apparently spend more than we do, because their published figures indicate an expenditure of between

5% and 6% of turnover. When you remember, however, that the cost per man engaged on research is higher in the U.S.A. than it is in this country you will see that our research effort, judged by the standard of numbers employed on research, is probably somewhat above average.

EDITOR: *And what emerges from all this expenditure of effort on research?*

FERGUSON: Experience shows that the work intended to increase the efficiency of our existing processes has been, and is continuing to be, profitable. Again, that part of our research work devoted to finding out how to make a new product on a large scale is obviously indispensable. Finally, we have discovered, and are discovering, valuable new products and processes. Pre-war successes include two of the most important polymers—polythene and polymethyl methacrylate—and during the war years we unearthed the hormone weedkillers, which play a valuable role in modern agriculture, and also the outstanding insecticide benzene hexachloride. In the pharmaceuticals field we have produced 'Paludrine,' the first really satisfactory antimalarial, 'Antrycide' for treating trypanosomiasis in cattle, 'Mysoline'—a valuable drug for the treatment of epilepsy—and 'Fluothane,' the best inhalant anaesthetic yet known.

The 'Procion' Discovery

New dyestuffs are, of course, continually being produced all over the world, and I.C.I. is responsible for some very outstanding ones. One of our most interesting ventures was the introduction of phthalocyanine pigments—made possible by the discovery of the first entirely new kind of colour-forming compound for over a quarter of a century. Then, recently, we have discovered and developed another entirely new type of dyestuff—chemically reactive dyes—known by the trade name of 'Procion.'

Among the new processes we have worked out I might refer to the sodium process for titanium, our isomerisation process for production of para-xylene, the development of the 'Terylene' process, and mention also our extensive process development work on the production of alcohols by the "Oxo" process.

(Continued on page 85).



Preparing experimental batches of phenol-formaldehyde resin



An infra-red spectrometer in use in a Billingham research laboratory

Examining apparatus used to study oxidation processes



People and events . . .

Tretamine and Cancer Research

IN a recent issue of *The Lancet*, Mr. Gordon D. Jack, a Manchester chest surgeon, described his experience with Tretamine in the treatment of certain types of lung cancer.

Tretamine, or triethylene melamine, was first prepared in Germany for use in making textiles crease-resistant and quicker drying, but its medical properties were evaluated in the research laboratories of the Pharmaceuticals Division in 1949 and the drug has been made available by us for some time for use in the treatment of certain diseases of the blood cells, such as leukaemia.

The feature of Mr. Jack's paper, which describes some forty cases of bronchial carcinoma, is that in four of these cases the chest X-rays of patients who were considered completely inoperable, and therefore doomed, have returned to normal or near normal. Although the number is small, this is something that has not previously been described with triethylene melamine or other drugs. Mr. Jack claims that these better results are achieved because he gives the triethylene melamine in a single large dose intravenously rather than in repeated small doses by

* * *

mouth, as was previously the routine. There is no suggestion in the paper that these patients are cured, but Mr. Jack's experience should encourage everyone working in this field that a solution to the problem of cancer is possible.

Since the publication of Mr. Jack's paper requests for supplies of the drug, of which I.C.I. is the only manufacturer in the United Kingdom, have been received from all over the world.

Staff College Appeal

ONE of Sir Alexander Fleck's last engagements as Chairman was to hold a press conference at Imperial Chemical House on 4th February. On that day, with the backing of Sir David

Eccles, the Minister of Education, he launched an appeal to industry to provide funds to set up a staff college for senior teachers in colleges of technology and commerce and senior industrial staff. He is asking for £100,000 as a single once-and-for-all contribution, of which £60,000 had already been promised by thirty firms at the time of the conference. So far as he was aware, said Sir Alexander, this was a wholly new departure. He did not know of any similar college in any other country.

The college will offer a series of 2-4 week courses, and if all goes well it is hoped to start the first before the end of 1961. Probably about 200 people will pass through the college each year.

Sir Alexander has accepted the invitation of Sir David Eccles to be the first chairman of the governing body of the new staff college, and he takes with him in this new task the affectionate wishes of all in I.C.I.

P.P.L.'s Five-year Plan

THIS season Plant Protection starts a five-year marketing campaign to increase its share of the retail garden products business.

March 12th sees the start of the biggest-ever publicity campaign by any manufacturer in the gardening field. Advertisements for I.C.I. garden products will appear regularly in the major national dailies, and these will be backed by heavy TV advertising for 'Plus,' the new all-purpose fertiliser (announced in last month's *Magazine*) and for 'Solufeed,' 'Sybol' and 'Slug End.'

A new and better garden booklet giving hints on how to get the best results for your flowers, vegetables and fruit using I.C.I. garden products has

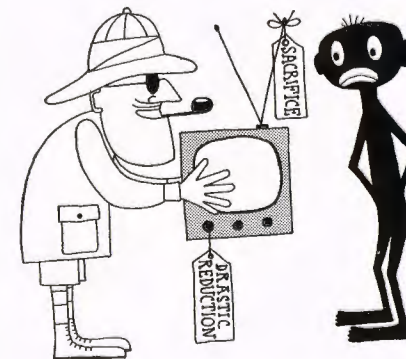
been prepared and is already available free from leading garden shops.

Tying in with the campaign, P.P.L. will this year have a special stand at the Chelsea Flower Show, and Percy Thrower, the TV garden expert, will be appearing both there and at special garden weeks at large stores up and down the country. Incidentally, Mr. Thrower is also writing a series of gardening articles for the *Magazine*. These begin next month.

One Product, Two Prices

MR. S. P. Chambers, our new Chairman, was among the contributors to a special series of articles on the world in the 1960s published recently in the *Financial Times*.

Mr. Chambers had something to say about the dangers of "dual pricing." The practice of selling at home at a reasonable profit while at the same time selling the same goods abroad at little over marginal production costs in order to maintain output at as near full capacity as possible is, he warns, on the increase, and it can be



expected to grow as more of the world's trade is based on highly capitalised industries.

He sees dual pricing as a problem to be faced up to on an international basis. "Cartel," he writes, "is a dirty word; but it is sometimes overlooked that international agreements of some kind may be an essential condition of fair competition. At present there are too many economists on both sides of the Atlantic who have not yet attempted to grapple with the theoretical complexities or practical implications of dual pricing in international trade.

But in the 1960s the light may begin to dawn on them, and there may be hope for support for rational and desirable agreements which are consistent with fair competition."

Shutdown at Billingham

THE million-to-one failure of two small pieces of electrical equipment in the Power Station on 15th January resulted in the most complete shutdown in the history of Billingham Factory.

Except for a few of the newer offices and research buildings, whose electricity supply comes direct from the North Eastern Electricity Board, almost every plant, workshop and office building on the site was without electricity for light and power from about 2.30 p.m. until late in the afternoon, and many were without steam for heating, process operations, or for driving machinery for even longer periods.

Despite the suddenness and completeness of the shutdown, however, it resulted in comparatively little damage to plant or equipment, and in some parts of the factory output was back to normal within a few hours of the full restoration of power and steam supplies early the next morning.

The shutdown was caused by the simultaneous failure of two small pieces of equipment during a routine operation in the power plant that has been carried out every Friday afternoon since the Power Station started up thirty years ago. Steps have already been taken to prevent the same thing happening again, however remote the chances are.

Research Award

IGET such a kick out of analytical chemistry and enjoy it so much that I wanted to put something back in as well—it's as simple as that." That is how **Mr. W. T. Elwell**, head of the Analytical Section of Metals Division's Research Department, described his reason for presenting a handsome solid silver cigarette box, hand-made by Birmingham craftsmen, for annual competition to "under 30" members of the Midland section of the Society

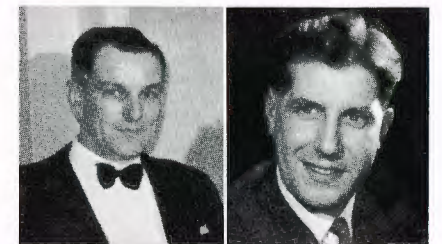
FERTILISERS

The Monopolies Commission published its report on chemical fertilisers on 16th February. Later the same day the Company issued this statement:

The Board of I.C.I. has noted the general findings of the Monopolies Commission Inquiry on the Supply of Chemical Fertilisers in relation to the Company. The Commission, after a detailed investigation lasting some four years, state as their general conclusion "that neither I.C.I.'s monopoly in nitrogenous fertilisers nor its actions as a monopoly supplier operate or may be expected to operate against the public interest. On the contrary, . . . we think it right to say that in our opinion I.C.I., in the development and conduct of its fertiliser business, has shown a conscious regard for the public interest."

The Commission also state that "as regards I.C.I., we have found nothing in the history of the development of the Company's present position to suggest that it has abused or is likely to abuse its monopoly power."

for Analytical Chemistry. The cigarette box carries a plaque inside its lid, framed by ornamental strips of four of the metals which are currently being developed for use in modern industry—titanium, zirconium, niobium and tantalum.



Mr. Elwell

Mr. Clark

Seven papers, all of them on some aspect of analytical chemistry, were submitted to the judges—Professor Belcher of the University of Birmingham; Dr. Garratt, Chief Analyst of Boots the Chemists, Nottingham; and Mr. Elwell himself. Three finalists were selected to read their papers to a local section meeting of the Society at the University of Birmingham in January. They were Mr. M. L. Richardson (Messrs. John and E. Sturge Ltd.), **Mr. R. T. Clark** (Metals Division), and Mr. D. Hazelby (British Thomson-Houston Ltd.).

The outright winner was Raymond



The three I.C.I. men who evaluated the medical properties of triethylene melamine: Dr. J. A. Hendry, Dr. F. L. Rose and Dr. A. L. Walpole

Clark. His paper was on polarographic determination of small amounts of tin and lead in zirconium and its alloys, the work on which he has chiefly been engaged during his four years as an assistant technical officer in the Witton Research Department. This work is a development of trace analysis methods which won a Nobel prize for the Polish scientist Heyrovsky last year.

Division made Simple

THE head reader at The Kynoch Press, **Mr. Eric Bastow**, is an expert at division. But with this difference—he deals in words, not figures. Mr. Bastow is an authority on the breakdown of words into syllables for the purpose of carrying them from one line to another on the printed page. Some years ago he compiled a compact guide to the correct division



of English words, and his colleagues at The Kynoch Press have used it ever since.

The Kynoch Press in the course of its work undertakes a lot of foreign language printing. Mr. Bastow therefore decided to try to devise a systematic guide to word division in foreign languages similar to his English guide which had proved so successful. Starting with Italian, he worked out a fool-proof if highly unorthodox system of indicating alphabetically on a card not much bigger than a postcard the correct division of any word in the language. What is more, it could be understood just as well even if the typesetter knew no Italian. Spanish was tackled next, then German, and finally French.

His "guide," which brought Mr. Bastow an award of £25 under the

I.C.I. Suggestion Scheme, is now being taken up by the Monotype Corporation, manufacturers of typesetting equipment. They are so impressed with it that they have bought the copyright and plan to distribute copies to all their customers.

Stanzas on the Night Shift

THIS light-hearted contribution is the work of **Mr. John Leake**, an employee at Ammonia Works, Billingham. We like it, and we hope readers will too.

"The job's a buck,
And the best of luck,"
Says Harry at quarter to ten.
He gives me a wink,
Then he's off for a drink,
And in come the night shift men.

We are the night shift men, my dears,
We are the night shift men.
Ours is a weary, dreary grind;
But we don't mind,
Because we find
The money goes further this way.

The tea's been brewed,
The lads talk rude,
The plant goes rumbling on.
I'll have a drag
From a half-smoked fag,
And natter a bit with Ron.

We are the night shift men, my dears,
We are the night shift men.
Social misfits are what we are;
But I've got a car,
I don't live far,
And the pay goes further this way.

At half-past three
A mug more tea,
And yesterday's paper to read.
Quarter to four,
Only two hours more,
Then sleep is all I shall need.

We are the night shift men, my dears,
We are the night shift men.
You'll see us going to work at night
In the orange light,
But the job's all right,
For the management's fast asleep.

Film helps save a Life

AN I.C.I. medical film helped to save a routine tonsil operation on a six-year-old child at an Australian hospital from developing into a potential tragedy when the child's heart stopped beating.

Only two nights before, the hospital's theatre staff had watched the

PEOPLE

Mrs. Sybil Stone, senior assistant librarian at Metals Division headquarters, has been appointed chairman of the Birmingham and District Branch of the Library Association. She is the first industrial librarian to hold the office. All previous chairmen have been public or university librarians.

The Council of the Institution of Mining Engineers has elected **Dr. James Taylor**, I.C.I. Main Board Director, to the honorary membership of the Institution. The Duke of Edinburgh is among the eight other honorary members.

Mr. P. W. B. Semmens (Billingham Division), well known as a writer and lecturer on railway subjects, gave his first radio talk recently. The talk, which was on the Darlington-Penrith line, was broadcast in the Third Programme.

First thoughts definitely did not prove best for **Mr. C. A. MacInnes** (Ardeer Factory), who decided to cash a Premium Bond. He filled in the form, absentmindedly tucked it away in a drawer, and then forgot all about it until a letter from Ernie arrived informing him he had won £25 on the bond he had forgotten to cash.

Mr. A. S. Reid (Nobel Division Research Library) recently spent several weeks in Switzerland on loan to the International Labour Organisation in Geneva. He was attached to the Occupational Safety and Health Division, and he was working mainly on an indexing system for the classification of explosives.

Sales gimmick of African Explosives and Chemical Industries' 'Vynide' sales manager, **Mr. Len Fish**, is a pair of 'Vynide' shoes. "They're experimental," he says; "but the shoes have many advantages. They don't need polishing, they are light and cool, and they are cheap compared with leather."

Mr. Herbert Beavers (Plastics Division) spent the New Year in Hamburg at the expense of the *Daily Mirror*. His was one of the six best postcards sent in by "Mirror" readers describing why they would like to greet the New Year in the far-away city of their dreams.

Patrol leader **David Ikin** of Winton Senior Scouts recently qualified for his Queen's Scout Award. He is an apprentice electrician at Alkali Division's Lostock Works.

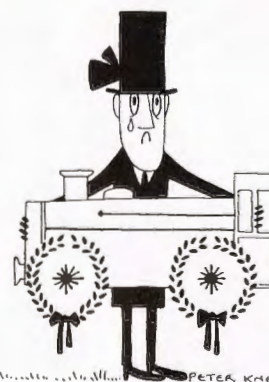
Mr. Jack Roberts (Alkali Division, Labour Dept.) has qualified as a coach of the Grand National Archery Society.

I.C.I. film *Cardiac Arrest* dealing with exactly the same surgical emergency. None had ever seen the emergency actually occur in a hospital theatre. Cardiac arrest is something that happens not more often than once in every 50,000 operations. When it does happen the surgeons have a maximum of three minutes in which to restart the patient's heart. After that, irreparable damage is caused to brain tissue. The procedure is to make an incision over the heart and massage by hand to start the circulation. In this case the job was done in two and a half minutes—30 seconds to spare.

The matron of the hospital, speaking to an I.C.I.A.N.Z. representative, said that her operating theatre sisters were extremely grateful they had seen the I.C.I. film two days earlier, and she is now arranging for our film to be shown to all her nursing staff at least once a year from now on.

Veteran Railways

THE virtual expulsion of the steam locomotive from the main railway lines of Europe compels its devotees to turn to the branch lines, and above all to those of narrow gauge, to find fresh stimulus for their enthusiasm. Two books which have just appeared, respectively from the Cleaver-Hume Press Ltd. and Ian Allan Ltd., *Steam on the Sierra* and *Narrow Gauge Railways of Europe*, will bring comfort and inspiration to the bereft. **Mr. P. C. Allen**, well known throughout I.C.I. for his interest in railways of all kinds,



is joint author of both. He has employed his usual lively style and factual precision to compile an introduction and guide to the European narrow-

gauge systems, particularly (*Steam on the Sierra*) those of Spain and Portugal, which will not only open whole new vistas of interest and delight to his readers but no doubt substantially augment the tourist traffic to many romantically picturesque and little-known parts of Europe. Both books are thoroughly readable, and give real value for money even at the comparatively high price of 35s. per volume. The photographs are all of exceptional quality, and many are outstanding for their beauty.

Fire at Elliott Works

CIVIL Defence volunteers do a job which is of real value to the community, but they have to be genuine enthusiasts to maintain their interest in training year in and year out with only the stimulus of occasional competitions to keep them on their toes. No one, of course, hopes for an emergency which will put their prowess to the test, but the Elliott Works of Metals Division recently had cause to be thankful that a Civil Defence training session was in progress at the factory.

One evening in January **Mr. Stan Ketley** was on his way home. As he walked past the substation which distributes the electricity supply to the whole of Elliott Works he noticed a glow coming from a window which was normally in complete darkness at that particular hour. Cautiously he opened the door, to find that the store-room was ablaze. He immediately ran to the duty electrician, who grabbed a fire extinguisher from its place, instructed his mate to alert the Works Fire Brigade and the City Fire Brigade, and to inform the Fire Officer, who he knew was in the canteen attending a Civil Defence lecture.

★ ★ ★

Effective training ensured prompt action by all who heard the message—they made their way to the substation carrying fire extinguishers and immediately fought the flames. The fire was under control by the time the City Fire Brigade arrived.

Nor did they forget the particular needs of their job. In the Electric Furnace Casting Department, where

non-ferrous metals are melted before casting into billets, the metal must immediately be poured off if the electricity supply fails, in order to prevent the metal from setting in the furnace and putting it out of commission for a considerable time. The furnace people were alerted and quickly carried out the necessary drill.

A Night to Remember

ON a recent visit to London, **Mr. Tom Teece**, who works in the Labour Office of Alkali Division's Construction Works, had the opportunity to live again the grim drama of his war years as a member of a famous U-boat killer crew.

The occasion was the reunion of the crew that served under the late Captain F. J. (Johnny) Walker, C.B., D.S.O. and three bars, R.N., and the meeting was arranged by Warwick Film Productions Ltd. (they made *Cockleshell Heroes*), who are due to begin filming Walker's second world war exploits, already the subject of a book, in about a year's time. They invited Tom and five of his wartime shipmates to go to



Shipmates of the late Captain "Johnny" Walker. Mr. Teece is on the extreme right.

their London office and revive memories of the battles in which Walker played such a vital role.

For Tom Teece, a Chief Petty Officer telegraphist under the legendary captain from the time he took command of the sloop H.M.S. *Stork* in the early part of the war until his death in 1944, it was indeed a night to remember. It was a night of reminiscences, recalling the grim Battle of the Atlantic, in which Walker and his crew

figured so highly, and the occasion when they returned in triumph to Gladstone Dock, Liverpool, with a score of six U-boats to their credit during a single spell at sea.

Gold Medal

THE men who discovered I.C.I.'s now famous 'Procion' dyes, **Mr. I. D. Rattee** and **Dr. W. E. Stephen**, have been awarded the Gold Medal of the Society of Dyers and Colourists. They will receive their medal at the Society's annual dinner in April.

'Procions,' as readers may remember, are the dyes which stand up to repeated washing with soap or detergents because they combine chemically with the fabric, whether cotton, rayon, silk



Mr. Rattee

Dr. Stephen

or synthetic. They were first introduced four years ago, and their regular use has now spread to more than fifty countries.

Dr. C. J. T. Cronshaw, who retired from the I.C.I. Board in 1952, has been awarded the Society's Perkin Medal "as a leader under whose enthusiastic guidance phthalocyanine pigments and derived textile dyes were first made available and their basic constitution established."

I.C.I. Subsidiaries—I

WOULD you be surprised to see motor cycle components on a list of I.C.I. products? If so, you don't know your Company as well as you probably thought you did. Amal Ltd., a subsidiary company in Metals Division, has been making carburetters and other products for the motor-cycle industry for nearly forty years. It was originally formed by the amalgamation of three companies who were pioneers of the manufacture of motor-cycle carburetters: Amal Ltd. (then a sub-

IN BRIEF

Czech agreement. An agreement has been reached between I.C.I. and the Czechoslovakian Siron National Corporation whereby I.C.I. has granted to the Corporation a non-exclusive licence under certain patents in Czechoslovakia for the manufacture of polyester fibre. The rights granted do not cover the provision of technical information or any rights to use I.C.I.'s trade mark 'Terylene.'

Sweet Seventeen. Huddersfield Works, Dyestuffs Division, have now achieved their target of a million hours without a lost-time accident for the seventeenth time.

Boat Show. 'Terylene' figured very prominently at this year's Boat Show—the biggest so far held. 90% of all sails in the show were 'Terylene,' and 30% of these were coloured.

Long service. At six dinners to be held this spring at Billingham long service awards will be presented to over 500 employees of the Division—a total of 408 payroll and 95 staff.

Chlorine by sea. Liquid chlorine for Du Pont's synthetic rubber plant in Northern Ireland is now being shipped in bulk from Castner-Kellner Works, Runcorn. The ship has been specially designed to carry liquid chlorine in pressurised tanks forward of the main hold. On return trips from Ireland the main hold is used to carry a cargo of neoprene rubber.

I.C.I. Wilton's Charities Fund. In its first year the Wilton Charities Fund has got off to a good start. £1451 contributed by voluntary subscribers among Wilton employees has been donated to charities, principally in the Tees-side area.

sidiary of Nobel Division), Brown and Barlow Ltd., and C. Binks (1920) Ltd.

The company's chief products today include carburetters and control assemblies for motor cycles, mopeds, and industrial and agricultural machines; fuel pumps for commercial vehicles, cable and wire control mechanisms, flame traps and gas-burning equipment.

Today practically all makes and models of British and some foreign motor cycles are fitted with Amal carburetters. The world's fastest motor cycle speed (214 m.p.h.) was achieved by a Triumph 650 c.c. twin cylinder Thunderbird fitted with two Amal carburetters, and since the Isle of Man T.T. races started in 1907, motor cycles fitted with our carburetters have

obtained no fewer than 71 first places in senior and junior events.

Honorary Game Warden

Mr. Kenneth MacArthur, who is employed by Plastics Division at Dumfries Factory, has been given a big chance to prove a conviction. He is something of an expert on roe deer, and he has a theory about how to improve the deer stock in national forests. So impressed is the Forestry Commission that he has been appointed honorary game warden for Mabie National Forest, about two miles from the town of Dumfries.

The Forestry Commission have given complete control to Mr. MacArthur for a five-year period. Now only he is permitted to shoot deer in the forest. Earlier control of



the roe had been indiscriminate, ineffective, and sometimes just bad. His theory is that when numbers have to be reduced, the deer shot should be individually chosen because they are of inferior stock, are old, or are surplus to the even balance of buck and deer in the entire forest.

By practising this policy of controlling numbers by reducing poor stock he is convinced that as the years pass the general quality of the roe deer in Mabie will rise, and he foresees a distant day when a man may be licensed to stalk for a deer that is scheduled to go. That, however, is some way ahead.

He beat Dr. Moore

AMONG the many people who have recently tackled the long walk from Edinburgh to London, the youngest and one of the most successful was Terry Aspinall, the 16-year-old son of a Paints Division employee, **Mr. R. Aspinall**.

With an 18-year-old companion, Terry was the first East Anglian to attempt this feat, and the couple managed to knock a few hours off the time of 7½ days taken by Dr. Barbara Moore.

The two boys lived on a diet of fish and chips for most of the journey, and their shoes were completely worn out by the time they reached Marble Arch.

In spite of their good time, they had been delayed somewhat by losing their way once or twice in fog and also by an ankle injury suffered by Terry's friend.

First Shot at the "Monte"

Mr. Leonard Quevatre of Plastics Division's Export Department fulfilled a long-held ambition when he took part in this year's Monte Carlo Rally. He was one of a crew of three

driving a 1959 Singer Gazelle. Together the same crew have competed in the R.A.C. International Rally five times and in most of the other British national rallies, but this was their first "Monte."

They elected to start from Glasgow and survived as far as Bourgoin on the edge of the Massif Central—1650 miles out from Glasgow but still 570 from Monte Carlo—where they were obliged to retire, as they were running over an hour late due to appalling black ice and fog conditions.

Although out of the rally they proceeded on to Monte Carlo and made merry at the round of official junketings organised for competitors before returning to England. The Gazelle, reports Mr. Quevatre, ran perfectly the whole time and was unscratched on its return to England.

50 YEARS' SERVICE

The following employees have completed 50 years with the Company: **General Chemicals Division:** Mr. H. Garner, Castner-Kellner Works (18th February). **Nobel Division:** Mr. J. Agar, Ardeer Factory (20th February). **I.C.I. (Hyde) Ltd.:** Mr. L. Cooper (1st February). **Salt Division:** Mr. H. Bourne, Stoke Works (22nd January).

APPOINTMENTS

Some recent appointments in I.C.I. are: **Salt Division:** Mr. A. Crabtree, Distribution Manager. **Paints Division:** Mr. H. A. D. Perry and Mr. L. D. Stewart, Managing Directors (jointly with Mr. J. D. Rose).

RETIREMENTS

Some recent announcements of senior staff retirements are: **Head Office:** Mr. A. W. J. Cox, head of Travel and Visitors Department; Mr. J. L. S. Steel (Economic Planning Director (retiring 24th March)). **Salt Division:** Mr. F. Daugherty, Distribution Manager.

PATTERN OF RESEARCH (continued from page 79)

EDITOR: I take it that this record, which seems pretty good, compares favourably with that of our competitors?

FERGUSON: In many respects the record is gratifying, especially by comparison with that of any one other Company, but we are certainly not complacent about it. We have many competitors all over the world, and the aggregate of their potential for discovery in our field of industrial chemistry must always be greater than ours. Really major industrial discoveries seem to come at rather long intervals, and anything which can be done to ensure that the next one arises within I.C.I. must get first priority.

EDITOR: Is it possible, then, so to organise the Company's research effort that such discoveries are made more probable? I notice that Lord Hailsham, Minister for Science, stated a few days after assuming his new office that all industry should increase its research effort. Do you agree with him?

FERGUSON: It certainly seems that some British industries do an inadequate amount of research and that their effort should be increased. A mere increase in the absolute amount of effort, measured by the expenditure on research, will not, however, answer the first part of your question. It is useless to do no more than collect together a number of competent scientists, put them into a laboratory and hope that, somehow, something of commercial value will emerge. More important than the absolute amount of research effort is the proper selection of targets: the research must be directed, in broad fashion at least, to desirable industrial ends which have some chance of being attained. To do this without at the same time going along a narrow path in blinkers is the main task of industrial research direction. This is not an easy task, and in general, I think, it receives insufficient conscious attention.

EDITOR: You argue a convincing case for doing industrial research by selecting targets and aiming at them. Are there

any other important techniques which could increase our discovery potential?

FERGUSON: There are many important lessons to be learned from the history of science in general and of invention in particular. They form the subject of "research into research"—a topic in which increasing interest is being shown. For example, while it is true that comparatively few chemical discoveries of commercial importance have arisen by pure accident, a considerable number have turned out to be the solution to problems rather different from those which the investigator set out to solve. The I.C.I. inventors of hormone weedkillers were originally intent on stimulating the growth of crops, but their observations on the deleterious effect of an overdose of hormones led them to attack the secondary target of destroying weeds. The inventors of the phthalocyanines originally aimed to remove an undesirable impurity from one of the Company's existing products, but the impurity turned out to have some desirable properties that justified setting up the new target of a revolutionary blue pigment. Polymethyl methacrylate—"Perspex"—was discovered in the course of a search for an interlayer for safety glass. It will be clear from these "domestic" examples that a major factor is the recognition of a discovery when you have got it. Here knowledge of the user industries is of great importance.

The next stage is communicating the discovery to those responsible for developing and exploiting it—a step where the ability of the discoverer to express himself clearly and the judgment, enthusiasm and wide experience of the management are vital factors.

Finally, some major discoveries have consequences for more than one product, and it is important to recognise their wide implications at an early stage. Such discoveries do not close a chapter of research, but open the door to new effort and a new batch of related discoveries.

THE ELECTRON ACCELERATOR

By V. E. Miller (Dyestuffs Division)

High-energy electrons are important today because they will perform such valuable jobs as deep X-ray, sterilisation of pharmaceuticals and foodstuffs, the treatment of plastics to produce special characteristics, and the killing of cancerous growths. A valuable tool is the electron accelerator, which will step up the speed at which electrons travel and so enable them to do these special jobs.

HISTORICALLY the use of radiation on living organisms dates from the last century. In 1896, only a year after Röntgen's discovery of X-rays, F. Minik in Germany forecast the present-day applications of radiation for sterilisation. However, the eventual application awaited the development of powerful sources of radiation. One method of producing a powerful source is the linear electron accelerator, which, invented after the second world war, is a direct development of the techniques developed for radar.

The basic principle of the linear accelerator is that radio-frequency power is directed in pulses along a circular waveguide. These pulses last for 2 millionths of a second and are produced by a magnetron (a special type of radar valve) which feeds the accelerator at the rate of 500 pulses per second. The waveguide is so designed that the obstacles to the speed of the pulses are progressively reduced, thus producing acceleration much in the same manner as a skier moving from soft to hard-beaten snow would find himself accelerated. Moreover, the arrangement of

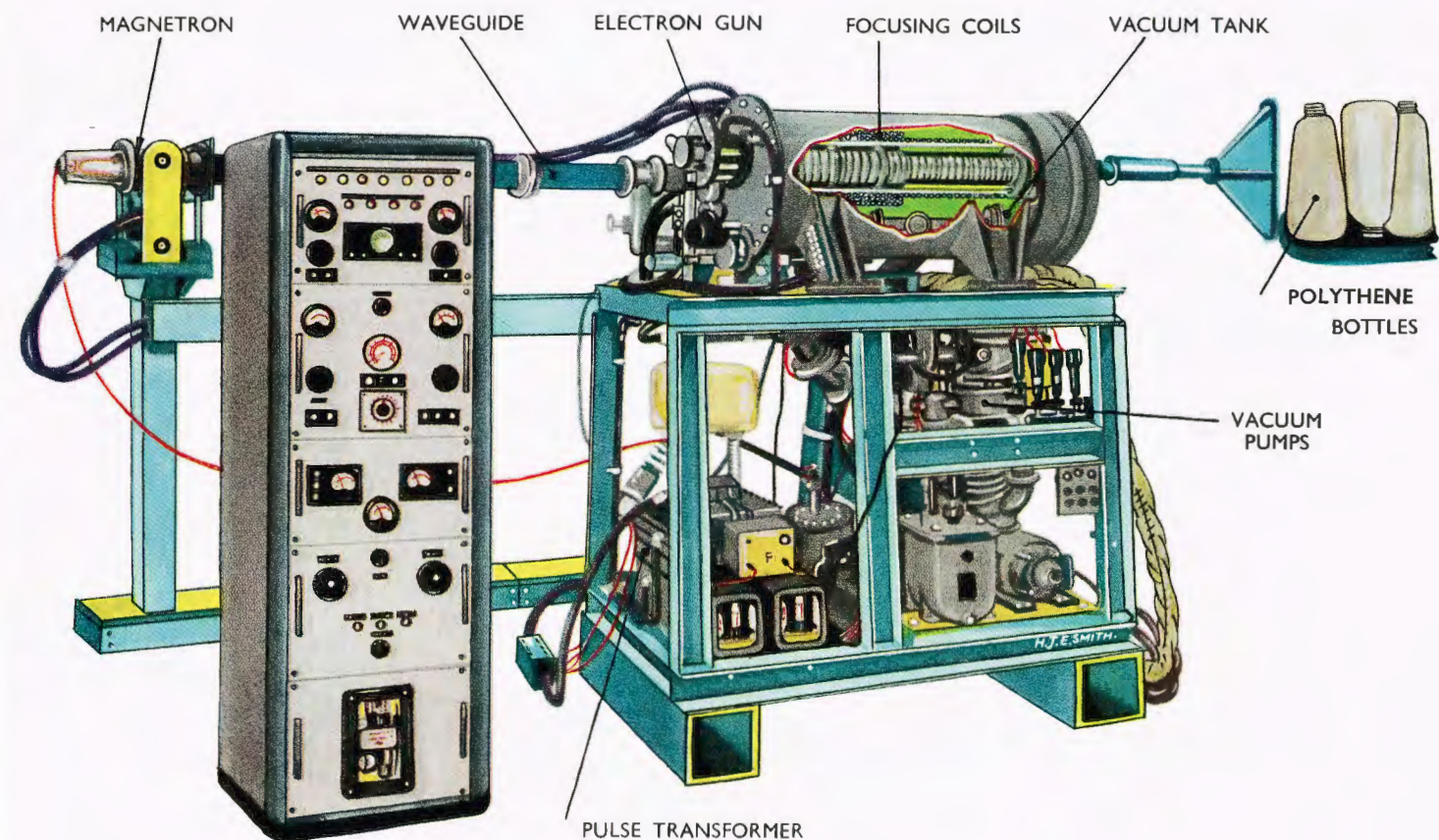
the obstacles within the waveguide can be varied and thus the rate of acceleration controlled.

The stream of pulses is then used as a vehicle to carry along the electrons to be used for irradiation. Electrons are injected into the system at a modest energy and in time with the radio-frequency pulse. They ride on the pulse, and as the pulse is accelerated they increase speed, like a surf rider cruising on the crest of a wave. In most industrial accelerators the electrons arrive at the end of the tube with a velocity equal to that which would be imparted to them by 4,000,000 volts.

The high-energy electrons produced by the accelerator can be used to bombard a metal target and produce powerful X-rays which will penetrate several feet of water.

Another use is the sterilisation of pharmaceuticals and foodstuffs, since high-energy electrons are lethal to living organisms.

Penicillin, for example, cannot be sterilised by heat, because this kills it. On the other hand, high-energy electrons raise the temperature of penicillin only a



The electron accelerator. The electrons originate in the electron gun and are accelerated along the accelerator guide and focusing coils in the cylindrical vacuum chamber; accelerated electrons impinge on the target, in this case polythene bottles. The magnetron supplies the power to accelerate the electrons.

few degrees and yet sterilise it thoroughly. The penicillin can be sterilised in its final package and so remain sterile until needed for use.

A basic use of high-energy electrons is the irradiation of plastics such as polythene and polystyrene. Many radio components have to stand up to high temperatures at some time in their life, and those made of untreated polythene tend to melt and deform. Until recently high-temperature components were made of materials which had poor electrical qualities but a high melting point. However, it has now been discovered that irradiation of polythene can bring about changes in its structure which alter certain of its characteristics but not its electrical properties. The cross-linking caused by irradiation enables the melting point of polythene to be raised considerably. It also reduces the effect of solvents. This irradiated material is being used to produce better-quality

components and insulation material for the radio industry.

The accelerator's greatest role is in the everlasting battle against cancer. Hospitals throughout the world, in places as far afield as Hong Kong and Australia, are using high-energy electrons and X-rays to cure patients who previously had no hopes of survival. Cancerous growth can be killed in much the same way as pharmaceuticals are sterilised. The technique used in irradiation therapy is precise and arduous. The doctor has to locate the growth and plan his therapy to treat only the cancerous part of the patient. The problems associated with the use of the electron accelerator in the hospital are so great that the art is highly specialised.

It is heartening to see a new technology beneficial to mankind growing out of techniques originally developed for military purposes.

BEYOND THE ARCTIC CIRCLE

By John I. Edwards



Life on a Norwegian sealer—hunting seals and bears in the Arctic Ocean—makes even tough herring trawlers from Yarmouth seem tame in comparison. But to these men on a 'varsity expedition it was just an incident on the way home from mapping Spitsbergen, 600 miles from the North Pole.

Photographs taken by the author with a Kodak Retina 1A (f3.5) camera and using Ilford colour film D

UP to a thousand miles north of the Arctic circle, on the coasts of Spitsbergen and east Greenland, lie the breeding grounds of the seal and the polar bear, and into these waters fleets of tiny boats come every year to hunt them for their skins.

The serious work of the Norwegian sealers is done early in the year, when the boats thread their way through the huge ice floes and slaughter seals in thousands. The summer trip for bear is regarded as something of a holiday and is not nearly so profitable.

The few days I spent on one of these boats increased my respect for the men who make this their living.

I was a member of a small university expedition to northern Spitsbergen some 600 miles from the North Pole, and we had arranged that we would be picked up by a sealer which was returning to Norway after combing the pack ice for polar bear. Another expedition was working nearby, and they also arranged to travel on the *Isblink* so that we could share the cost.

We had made our base camp in a derelict trapper's hut on the shore. We had hardly got to sleep after completing the survey of our little piece of the Arctic when we were wakened by loud shouts. Two members of the Oxford

expedition with whom we were to travel burst into the hut and tipped us out of our sleeping bags with some derisory remarks about our pyjamas, clothing they considered incompatible with the hardest traditions of polar exploration.

The sealer was anchored about a hundred yards offshore, and the crew were anxious to start their journey. A large and premature breakfast off the remainder of our stores managed to change their minds, and they soon disposed of a tin of pineapple I had been hoarding throughout the expedition.

Packing went on right through breakfast, and by 8.30 the last box had been nailed up and ferried out. A few things were left in the hut, and as we swept it out and nailed up the door we wondered if we would ever see it again.

It was now our turn to go out to the sealer in the small and unseaworthy dinghy. As we approached her we became aware of a smell which was to become all too familiar in the next few days. We were never able to analyse it completely: a mixture of diesel oil, decaying meat, boiled blubber, and something of the zoo.

One of the Norwegians held the dinghy steady as I clambered over the side. My foot landed on something

soft and slippery. I looked down and saw that I was standing on a sheet of blubber which had just been stripped from a freshly killed seal.

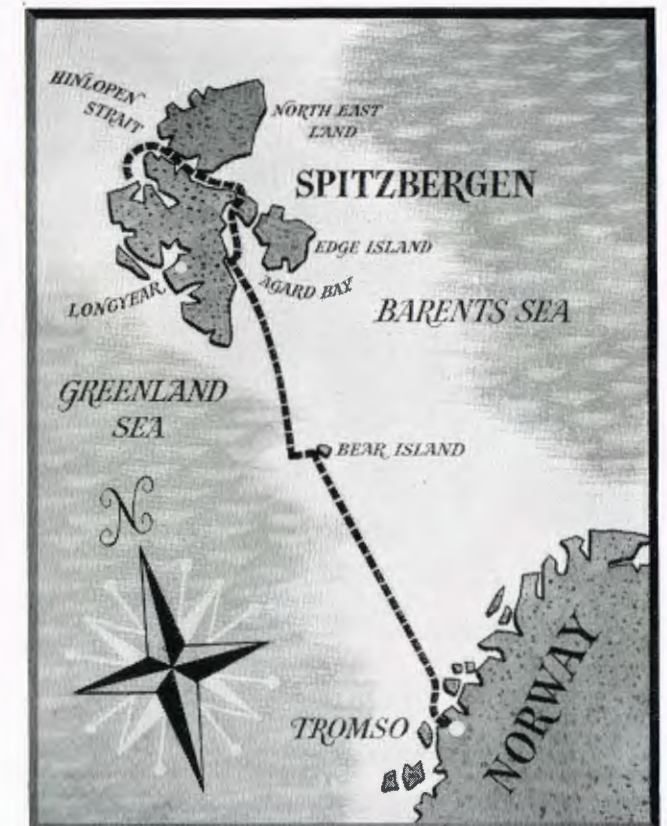
The doormat was uninviting, but perhaps as characteristic an introduction as one could get to life on *Isblink*. We stood on the deck and looked around. She was about fifty feet long and fifteen feet wide. Her displacement was 54 tons, and she was the smallest, dirtiest and cheapest boat to hire on the entire coast of Norway.

The first thing we noticed was that there were other passengers besides explorers. Most of the deck space was taken up with ten large boxes of wood and chicken wire, each containing a polar bear. The bears were between six and eight months old and not fully grown, but they were certainly big enough to cause trouble if they got loose from their rather inadequate cages. They obviously resented their confinement, and expressed this by periodically battering holes in the walls of their boxes. The bears all looked very much alike at first, but as we fed them on barley sugar and chopped seal during the next few days they became distinct personalities.

We left our little bay and headed round the northern tip of the main island to pick up the rest of the Oxford party, who were about a day's sailing away. The engine of the sealer had only one cylinder and was just a larger version of the one in the dinghy. Its steady thump was to become very familiar. Over the engine was the little wheelhouse. Behind it was the saloon with two bunks, and between this and the forecabin was the hold, which was crammed with bear skins, seals and expedition equipment. Ranged round the rear of the wheelhouse were barrels of rancid blubber. Forward of the hold was the mast and the crew's sleeping quarters, a small airless hole with six hard bunks. The rigging was hung with large lumps of blackened bear and seal meat, and the available deck space was covered with bears, skis, sledges, and boats—but mostly bears.

I trained my binoculars on the shore before we left the bay to try to get a last glimpse of the hut which had been our home for so many weeks. I could just make it out, squat and grey by the seashore. Near it, among the rocks, I caught a glimpse of white fur. Charlie, our half-tame Arctic fox, was prowling around looking for scraps. He had first appeared about a month before, and as he was fonder of pemmican than we were, his diet had been considerably increased and he had become quite approachable. He was the only animal we had seen on land, although seals often watched us curiously and followed us when we were moving around in our boat.

As we were preparing to catch up on some of our lost



sleep, the cook called us into the saloon for lunch. Being the newest arrivals, we were given the honour of being first shift. Among other things, this meant that we had fairly clean plates. In front of each of us he put a bowl containing a huge piece of meat. This was surprisingly good, although the cook's lack of English prevented us from finding out what it was. The engineer came in just as we were finishing and told us that we had been eating young polar bear. Bear turned up quite frequently after that, and, *mal de mer* permitting, we grew almost to like it—even boiled with prunes.

These small sealers are not, strictly speaking, ice-breakers, as they have neither the power nor the weight to break anything but the thinnest sea ice. For protection from the heavier floes they rely on their smoothly rounded bottoms. When the boat is beset, these allow the pressure of the ice to lift the hull instead of crushing it. While this construction is no doubt admirable in heavy ice, it means that the boat rolls heavily in the slightest swell and becomes something of a nightmare in a full gale. The long rolling seas from some Atlantic storm which lifted our stern as we went eastwards to the Oxford camp site gave us a foretaste of what was in store for us.

We reached the Oxford camp at about one in the morning. We could just make out the tents on a small piece of



Sunset in the Arctic. The pink glow of the midnight sun on the snows of Edge Island. (*Exposure f3.5, 5 seconds*)

land surrounded on three sides by the ice sheet and on the fourth by the sea.

As we nailed up boxes and ferried them out to the sealer, the captain began to show some concern at the mounting pile of kit which was swiftly filling the limited deck space. However, we got it all on board somehow, and by 6 o'clock we were going south through the calm waters of Hinlopen Strait with our passengers increased to twelve, excluding bears. The ship had taken on something of the appearance of a Christmas tree, with stores and sledges, skis and tents lashed into every available spot, from the top of the wheelhouse to the lower rigging.

As the sky cleared during the morning we could see innumerable small icebergs drifting north. Broken from the southern edge of the North East Land ice-cap, they were being driven by the wind and current to join their bigger brothers in the polar pack.

The day passed slowly, and we sat on the deck in the cold Arctic sunlight watching the ripples we made in the calm water as the monotonous thud of the engine lulled us to sleep. In the afternoon we stopped to collect fresh water and to make a reading on the Oxford gravimeter, an instrument which was always accorded the deference due to a holy relic because of the unbelievably large sum it was supposed to have cost.

Supper came and went. A mixture of sweet pickles, digestive biscuits, and the contents of some curious bottles labelled "ØI" which turned out to be Norwegian beer.

Although we had only been on the boat for a day, it was becoming increasingly apparent that there were too many of us. Bears were fetching about £125 apiece in Tromsø at that time, so we had strong suspicions that they would not be the first part of the supercargo to be jettisoned in an emergency. The ship's boats might hold twelve with difficulty, but there were eighteen on board. A meeting was called after supper, and we asked for volunteers to be landed at Agard Bay on the south-east coast of Spitsbergen and to walk from there to Longyear, the main mining centre, from which they could get a collier back to Norway.

I did not volunteer. My boots were worn out. The combination of wading and rough climbing had cut the leather to bits, and they had only survived the last few days of the expedition through the addition of pieces of tin hammered flat and held in place by roofing felt nails. Fortunately a sufficient number volunteered, and we spent the evening going through some ration boxes picking out the choicest items for their journey.

The sun was diving steeply towards the horizon in our wake, and we thought that at last it might disappear after our two months of daylight. The lower rim dipped, and a long sunset blended with the dawn. The snows of Edge Island glowed pink as we searched the silent foreshore with our binoculars, trying to pick out the herds of reindeer which graze on the mosses beneath the snow.

Freeman Sound passed by, and as the morning grew, we turned into Agard Bay to land the walkers. One of the party had as a guide a book written by Sir Martin Conway,



Sunrise in the Arctic. The cold yellow morning light blending with the last rays of sunset as the sun dips on the horizon but never quite disappears. (*Exposure f3.5, 2 seconds*)

who had made the journey some sixty years before. On their return some of the walkers were of the opinion that Sir Martin belonged to the "here be dragons" school. Some of his alarming descriptions bore little relation to the reality.

The party was ferried ashore in one of the boats. Photographs were taken, farewells were said, and we crept out of the bay, leaving the rather forlorn little group already with their backs to the sea, striking off westwards.

As we cleared the coastline, a single heavy sail was run up on the short mast to seize what little benefit there was in a light westerly wind. The absence of keel or leeboards made the sailing motion rather crablike and the navigation even less reliable than usual. The system of navigation was in fact extremely simple. A line was drawn on the chart from Agard Bay to Bear Island, a lonely piece of rock which is the signpost of the Arctic Ocean. From this line a magnetic bearing was obtained and the distance was measured. We then kept the bows pointing in the right

direction until the log line showed the appropriate distance. Then we started looking.

As the last white gleam of Spitsbergen slid away in a bank of grey cloud, the wind strengthened into a full gale. The bears did not appreciate the weather any more than we did, and their miserable howls told me that even bears can be seasick. I knew just how they were feeling.

The cook succumbed early, which relieved us of the necessity of facing any more bear and prune stew. Soon the blunt bows were shouldering cold grey seas which swept across the narrow deck space and through the bear's cages, reducing their howls of distress to muffled gurgles and turning their coats from dirty brown to gleaming white. The journey from fo'c'sle to saloon became very unpleasant, and any attempt to steady yourself by seizing the wire of a bear's cage might mean losing the end of your glove to a bear who was determined to take his revenge on somebody.



I soon found that even dry ship's biscuit, my universal standby, made me ill, so I gave up eating. I turned to the ship's drinking water and found that this now had a liberal addition of diesel oil, which did nothing to improve an already strong flavour of seal. Coffee did not manage to hide the taste, and as the beer was exhausted it looked as if drinking was indefinitely suspended as well.

Two days out from Agard, Bear Island should have appeared but did not. This came as a surprise to nobody, and the passengers wondered whether the continuous westerly wind would bring us to North Cape or perhaps into the White Sea and Archangel.

The captain and his brother, the engineer, raked in some dank locker and produced a rusty sextant, which they intended to use instead of steaming round in larger and larger circles until something turned up. The radio was coaxed into action to give us a time check, and during a lull in the weather some shots were taken. To our amazement we turned due east and the captain confidently predicted "Bear Island, tomorrow."

As the grey morning light showed the grim cliffs of Bear Island standing like some medieval fortress on the horizon, we shook our heads in amazement. The erratic compass card must have been more wildly inaccurate than we thought, but there was something rather comforting in the way in which these sailors, apparently so ill equipped, treated the cold grey ocean like their own backyard.

We stayed in the lee of Bear Island for half a day as yet another storm broke its fury over our heads. We jammed ourselves in the saloon, where the air became thick and fetid and the hours passed slowly. Some lay three in a bunk and roped themselves in, others tried to play cards or read, and some just concentrated on staying put.

The wind eased after a time and we could go on to the deck again without being swept overboard. In heavy weather it became impossible to work the sheets and sailing had to be abandoned, but now we tried a heavily reefed sail as we crept out of the wind shadow of the island and headed south again.

The bears had not been fed for some time, and they were also very thirsty. We went round the cages and at the cost of a wetting gave them each a pannikin of chopped raw seal and a ladle of water. Their hard time on deck trying to avoid being drowned had exhausted them, and their cries of distress were now less frequent. We cheered them up slightly with liberal helpings of barley sugar, which they had become very fond of.

Bear prices had been low that season, and as the captain had ideas of cutting out the middleman by selling direct to

English zoos we were all called in to list as many zoos as we could think of, with or without bears. The ice bear is fairly easy to shoot or capture in the summer, and this drop in price merely reflected the recent flooding of the market which had already ousted the solitary winter hunter who takes the bear by the light of the moon or the aurora, when his coat is prime but his temper is bad. The summer trade in indiscriminately slaughtered bears was slowly strangling itself, and we were by no means sorry.

The many seasickness pills we had swallowed since leaving Spitsbergen had not warded off seasickness at all but had the useful side effect of giving everyone acute constipation. The sanitary facilities on *Isblink* made this a very convenient attribute. A small box-like structure containing a bucket was lashed to the rail. The bucket was filled with sea water and emptied over the side after use. This simple procedure could only be carried out in a flat calm, as the eighteen inches or so of freeboard meant that the "thunder-box" was usually under water and the bucket crashed about in a highly unpredictable manner. One member of our party thought that the rather higher rail at the stern might be strategically sounder, but a passing wave pooped us, and him, at the crucial moment and he spent the next twenty-four hours wearing the engineer's fur jacket as a kind of kilt, while his clothes were draped over the engine to dry.

The weather eased off as we approached Norway and the blue-grey line on the horizon resolved itself into a line of ice-flecked peaks. It certainly looked like Norway, but whereabouts? I went into the wheelhouse, where the captain was standing with a pile of charts covering the whole of the Norwegian coast north of the Arctic circle. At the bottom of each chart was a little sketch showing the appearance of the coast from the sea. The captain was holding each of these up and comparing it with the approaching shore, then shaking his head sadly he would put it down and try another. The pile was getting quite low before he finally nodded and marked our position on the main chart. We were about thirty miles from Tromsø, which after three days on dead reckoning from our last landfall seemed most satisfactory.

The calm waters of the fiords seemed unbelievably still after our battering as we lay on the deck in the last rays of the sun. In a few hours we would be in Tromsø. I would have my first food and drink for four days and my first bath for two months. The expedition would be over, although we would always retain memories of the majestic silent wastes of the Arctic and of the men who go in their tiny boats to earn a hard living.

The Norwegian sealer "Isblink" at anchor off the northern coast of Norway. (Exposure f3.5, 1/25th second)

THE FLECK STORY

— IN PICTURES



Wallsend. The earliest photograph on our files. The Chairman, then Works Manager at Wallsend factory, with Works Councillors (1929).



Billingham. Salute the Soldier Week, 30th June 1944. Sir Alexander was Chairman of the Division from 1937 to 1944.



Runcorn. At Castner-Kellner Works. Sir Alexander is 3rd fr. l. in the front row. Others include the late Sir Holbrook Gaskell (centre), the late Sir Frederick Bain (4th fr. r.) and Dr. J. Ferguson, now ICI Research Director (back row, 4th fr. r.) (1934).



Billingham. The late King George VI and Queen Elizabeth visit the factory (June 1941).



Calder Hall. With Prof. Niels Bohr and the late Lord Waverley at the opening of Britain's first nuclear power station (October 1956).



Wilton. Sir Alexander, then ICI Main Board Director in charge of Billingham Division and C.A.C., with Lord McGowan at the official opening of the Works (September 1949).

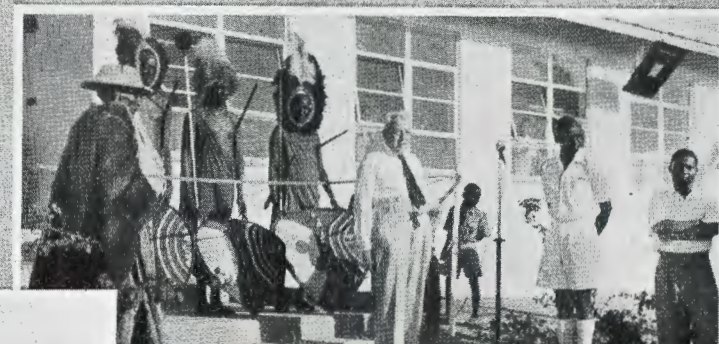


Blackpool. Sir Alexander's first Central Council after becoming Chairman. With Sir Edmund Hillary who lectured on the Everest ascent (November 1953).



Wilton. H.M. Queen Elizabeth at Wilton during a tour of the North-East (June 1956).

Magadi, Kenya. Opening a new school for African children at Lake Magadi Works. The guard of honour are Masai (July 1956).



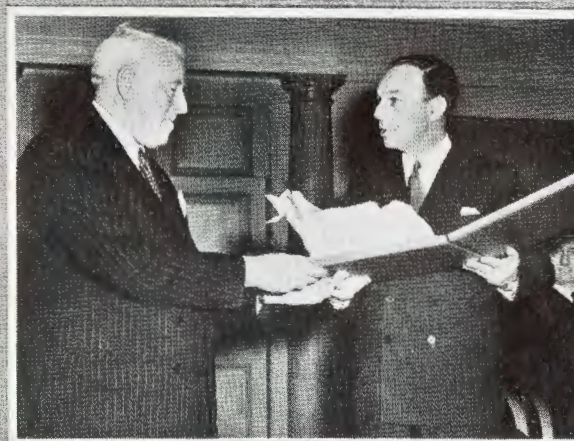
Bracknell. At Jealott's Hill Research Station for the visit of H.R.H. The Duke of Edinburgh (April 1956).



Snowy River, Australia. Sir Alexander photographed during a visit to the Snowy Mountain Hydro-electric power scheme (November 1954).



London. Sir Alexander receives his award for 40 years' service from Mr. S. P. Chambers (April 1956).



Blackpool. ICI Bravery Award is pinned on Mr. John Steward (Billingham) by the Chairman at Central Council (November 1955).





Glasgow. Sir Alexander delivers his inaugural address as president of the British Association (August 1958).



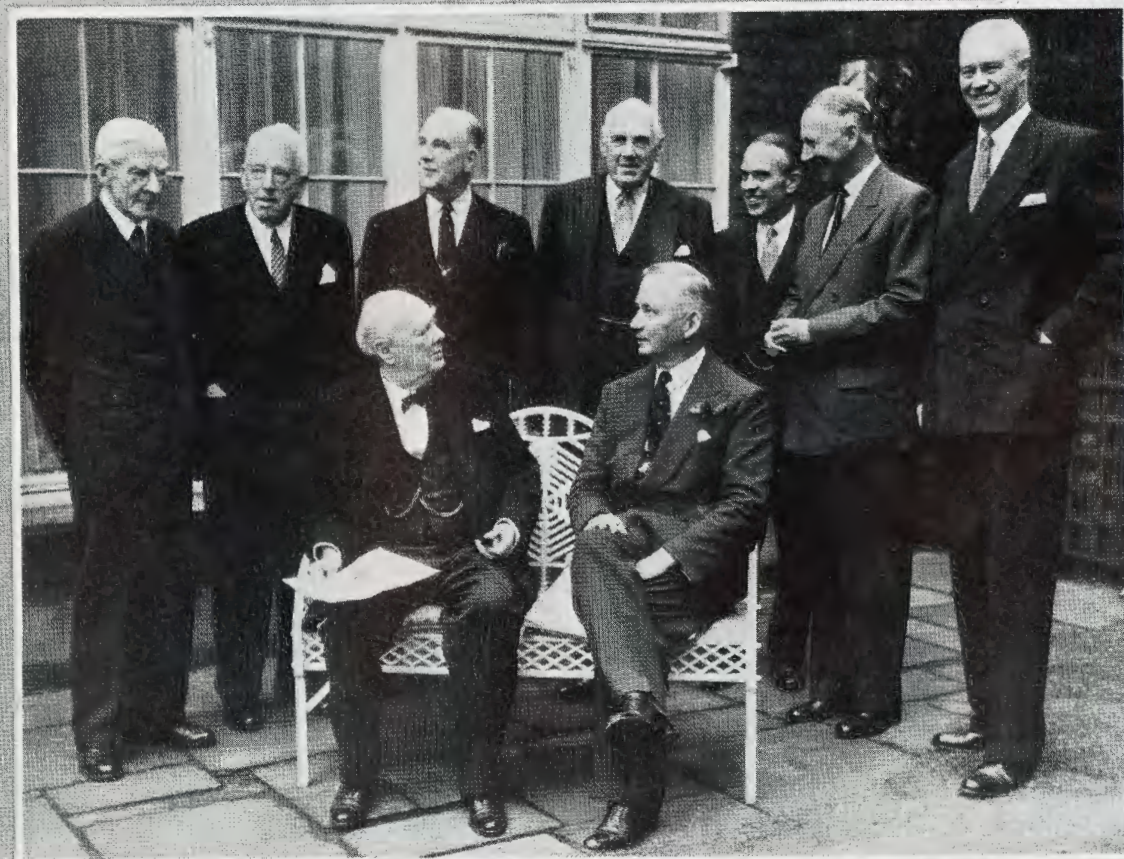
Melbourne, Australia. A "high level" talk with the Governor of Victoria at the official opening of ICIANZ's skyscraper headquarters (December 1958).



London. Congratulating Mr. Jack Webb, a boilermaker at Alkali Division, on his completion of 60 years' service (October 1958).



Huddersfield. Guest speaker at Huddersfield Works Foremen's Association annual dinner (December 1957).



London. With fellow trustees of Churchill College, Cambridge, at Sir Winston's London Home (July 1958).



Tokyo, Japan. A chopsticks lesson for the Chairman (April 1958).



London. With the Queen Mother at London University where he received the honorary degree of Doctor of Science (November 1957).



Chittagong, Pakistan. The Chairman takes tea with the ICI (Pakistan) staff at Chittagong (January 1958).



Delhi, India. Being greeted at the airport by Nehru. Sir Alexander was in Delhi for the Indian Science Congress (January 1959).



Fleetwood. Touring ICI works in the Fleetwood area, Sir Alexander (extreme left) watches the tapping of the carbide furnace at General Chemicals Division's Hillhouse Works (October 1958).

NEWS IN PICTURES

Home and Overseas



The Luton Girls' Choir recently arrived home from a tour of Australia and New Zealand. They are seen here in the 'Terylene' wool worsted skirts which they wore throughout the tour



Rosa-Lisa is a 64-ton motor sailer. Painted with I.C.I. paints, she is pictured here being launched in Syros, Greece



Mr. Brian Turner, a Wilton Works apprentice boilermaker, has won a cash prize awarded by the British Construction and Steelwork Association. He gained second place in a country-wide examination



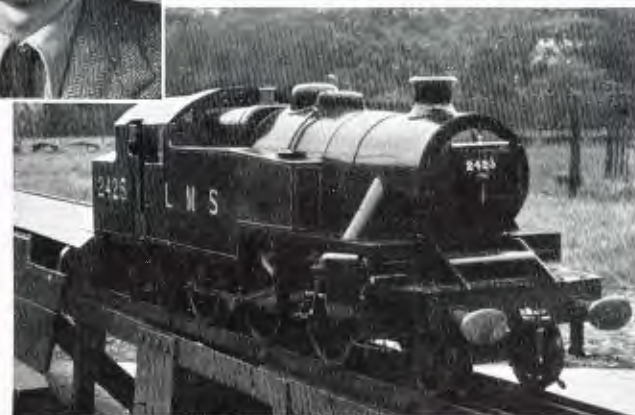
Brrrr! During recent snowstorms this formation of icicles hanging from a roof-market Factory was spotted by Paints employees. The icicles appear to have been blown inwards by the wind



Bird fancier. For Mr. W. Holmes of Billingham's Prudhoe factory, who started breeding but only seven years ago, 1959 was his most successful. He is seen here with some of the birds and a few trophies he has collected



Model loco enthusiast Mr. John Heslop (Billingham Division, Research Dept.) took 18 months to build this 5 in. gauge L.M.S. tank locomotive. It has won him a bronze medal at the National Models Exhibition in London. Last summer he spent many Saturdays giving rides to children in a local park, where the local model railway society has a permanent track



Fishy story. Mr. Ronald Melling (General Chemicals Division) is seen here with a 15 lb. 6 oz. pike he caught recently. For this difficult landing he used a 9 ft. fly-rod with an Ambidex spool and I.C.I. 'Luron' line with a breaking strain of 4 lb., a 7 lb. wire trace and a 1½ in. silver spoon



Meet Maxy. This delightful picture of Stephen Dundas making friends with Maxy the chimp was taken at the Belle Vue circus, Manchester. Stephen was one of the 170 children from the mid-Cheshire area who were taken to the circus under the auspices of an Alkali Division Charity Fund. During the visit the children had the opportunity to go backstage



Scottish honour. Mr. H. S. MacLean, a director of I.C.I. (New York) Ltd., has been elected president of the 204-year-old St. Andrew's Society of the State of New York. He is seen here (centre) being welcomed by the outgoing President



The old and the new. *The Architect* looks at 'Perspex' was the theme of a Plastics Division exhibition held in London recently. Miss Great Britain of 1959 is seen enjoying her first 'Perspex' bubble bath. Her Victorian companion—his vintage bath behind him—looks on disapprovingly

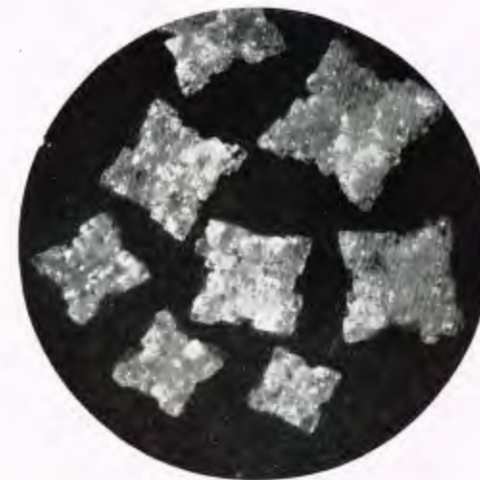


The children's race at the annual athletics meet of some of the I.C.I. (India) Calcutta offices. Sir Alexander Fleck, who was in India at the time, was present and distributed the prizes



On the summit. Mr. Jack Gillott, a 70-year-old pensioner of General Chemicals Division and still an intrepid mountaineer, is seen here on the summit of Glider Fach, Snowdonia, 3200 ft. up

Tough at the top. Nobel Division's Sandra Marshall and Isabel Bond (left) hold Scottish relay championships medals. Staying at the top can be as tough as getting there, as our picture of them training, toetouching with Mary McCubbing and May Orr, shows



Not stars but highly magnified grains of dendritic salt developed by Salt Division. Dendritic salt is used in such varied activities as curing sausage skins, de-icing railway points and butter-making



Mr. Norman C. Smith of General Chemicals Division's Bain Works is one of only a handful of men to hold the I.C.I. Bravery Medal. He was awarded this in 1930 for the part he played following an explosion at Billingham Factory. He is seen here at his recent retirement ceremony



Brunner House, Alkali Division's new headquarters, was formally opened by Sir Alexander Fleck in January. It stands in 6 acres of ground, houses some 750 staff, took just over two years to build, and has cost £900,000. Many I.C.I. materials have been used in its construction



"Hovis" retires. 77-year-old Mr. Walter "Hovis" Brown has retired for the second time, this time after three years as children's traffic warden. Here some of the children bid him an affectionate farewell.



Mr. Peter Glover (left), a commercial apprentice at Billingham, receives the Tees-side Chamber of Commerce silver medal as the best student of the year in the Constantine College Department of Commerce, from Mr. J. C. H. McEntee, Wilton Chairman

A LIBRARY OF CHEMICALS

By Kenneth Lunn (Dyestuffs Division)

A unique collection of 28,000 different chemical compounds is housed at Dyestuffs Division's Blackley Works. How this collection has been assembled and the vital function it serves in the scientific and research work of the Company are here described.

SOME people collect postage stamps. Others collect butterflies, beer bottle labels, birds' eggs, horse brasses and other strange things. But Mr. Peter Baker, of Dyestuffs Division, has a different collector's urge: he collects chemicals, or, to be more precise, fine organic chemicals.

His zeal in looking after and adding to his collection matches that of any stamp enthusiast, but there is one important difference between them—Mr. Baker's collection is designed to serve essentially practical ends. Furthermore, it isn't just a fascinating hobby—he is paid by the Company to do this work, to collect fine organic chemicals of every description and be able to supply samples or specimens of them on request to any chemist or other scientist in any Division of I.C.I. who may require them in the course of his work. He has often also been able to help chemical research workers at the universities through Dyestuffs Division's Academic Relations Department by supplying chemical compounds that were otherwise unavailable.

In the various research laboratories of I.C.I.—and particularly those of Dyestuffs and Pharmaceuticals Divisions—it is often necessary, when following up some particular line of enquiry, to prepare a starting material, or perhaps a whole series of starting materials, of fairly complicated structure before the real research work envisaged can be embarked on. Such preparatory work often occupies several weeks, even when the methods of preparation are known and fully described in the general chemical literature.

What is more, it is quite on the cards that some earlier I.C.I. research worker has at some past date already prepared the required compounds for use in some other research project. If only a sample—even a few grams—had been saved! Weeks or months of work might have been avoided, and perhaps a quick answer as to the worth-

whileness of the proposed new line of enquiry might have been obtained.

Well, that is precisely what Mr. Baker's collection aims to do. Suppose, for example, that you are a research chemist and you are interested in, say, compounds containing fluorine, a pyrazolone nucleus, and an alkoxy side chain, which you have reason to believe would be promising as, say, drugs for combating fowl pest. You ask Fine Chemicals Service to supply a few grams of any compounds they have with these characteristics. Within a short time—two days or so—back comes the list of compounds available, plus the samples requested, and you are off to a flying start.

Now, the problem of indexing 28,000 chemical compounds, which is what Mr. Baker's collection consists of at the present time, is a formidable one. Alphabetical indexing is far too cumbersome for such a vast number of chemicals, many of whose names might be fifty letters long and capable of being given in several different ways. A master card index classifies the compounds, firstly according to the number of carbon atoms in the molecule, then in subsections according to the number of atoms of other elements present—hydrogen, oxygen, nitrogen, chlorine, etc. Individual compounds are quickly found by reference to this index. The reference cards give the location of the sample, its origin, and sometimes important physical constants such as melting or boiling point.

Very often, however, it is not just a question of locating a particular compound. It may be necessary to find all the compounds with certain specified characteristics. For this purpose the now-familiar punched-card technique is used.

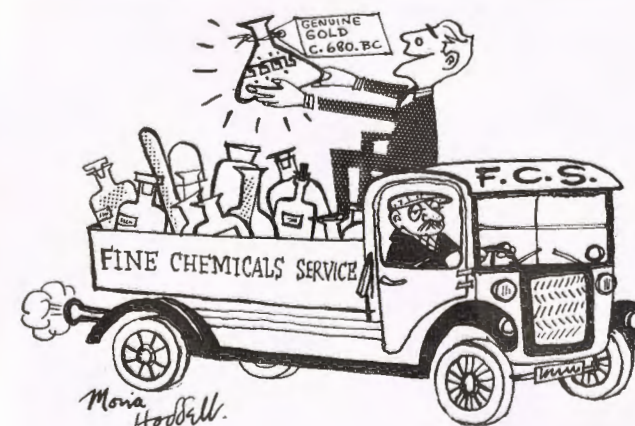
The design of the card, which caters for every type of organic chemical compound and allows for the punching of holes in positions representing 270 different constitutional and structural characteristics, is the work of Mr.

Ernest Hyde (now with Pharmaceuticals Division). He it was who developed the Fine Chemicals Service in its present form while a member of Dyestuffs Division research staff. He inherited the useful but modest specimen collection begun in the 1930s by Dr. A. Coulthard and redesigned and streamlined it to fulfil the vital functions it now serves in the scientific and research work of the Company.

We say Company and not Division because, when the need for a well-organised and centralised Fine Chemicals Service was recognised some time ago, it was Dyestuffs Division's collection, of the several then in existence within the Company, that was selected as being the one most suitable for development as a central I.C.I. reference collection or library. Mr. Baker freely admits his great indebtedness to Mr. Hyde, whose punched-card system and design have done sterling service, although, of course, future developments may dictate changes in it or extensions of it. After all, some 4000 new compounds are being added to the collection every year, and organic chemical science continues to make great strides.

The necessary searches for compounds of particular classes—containing one or more specific functional groups, as in the hypothetical case mentioned above—are made by means of an adapted Hollerith positive group selector, and the results of such searches are made available in the form of bound indexes for the convenience of future enquirers requiring the same information. As the collection expands, of course, such indexes—over 300 have been prepared to date—have to be periodically revised.

How does Mr. Baker collect his compounds? Well, like so many other successful (and sometimes great) organisations, the Fine Chemicals Service at Blackley depends on voluntary donations. Dyestuffs Division has the largest organic chemical research organisation within the Company—in fact, the largest in the whole British Commonwealth—and new chemical compounds are being prepared every day. The chemists of Dyestuffs Division's Research Department are the main contributors to the collection,



... willing to take delivery

although Pharmaceuticals Division chemists are important contributors, and other Divisions also help. If a research chemist is having one of those periodical clear-outs of his overcrowded shelves, the Fine Chemicals Service is ready and willing to take delivery of the entire load of discarded bottles and jars and sort them out, as opportunity offers, in the hope that there will be treasure trove among the usually overwhelming majority of mundane rejects.

The "treasure" sought, it should be emphasised, does not usually consist of rare or highly complicated compounds. Some of the most valuable finds are quite simple organic chemicals that are not, however, commercially accessible. Most chemists on the Company's research



... supply samples or specimens on request

staffs conscientiously supply specimens of any new compounds they prepare when they can, unasked, since they realise that only by doing their part can the valuable services provided by the Fine Chemicals Service be maintained and expanded.

Apart from requests of the type described, the Fine Chemicals Service has a number of "standing order" requests to supply samples of all new compounds for screen testing, notably for plant protection and pharmaceutical purposes. This is important because, although planned research programmes, following promising lines of chemical enquiry, have led to many new discoveries and to great improvements in medicinal drugs and other products, random testing of new compounds for particular properties often reveals surprising facts or relationships and opens up fruitful new lines of research.

Chance, as well as logical thinking and experiment, plays its parts in scientific discovery, and Mr. Baker's "library" of chemical compounds ensures that the net is cast as widely as possible in garnering these offerings of Providence. The principal function of the Fine Chemicals Service remains, however, the saving of valuable time and effort that would otherwise be spent by our research teams in routine preparative work.

THE INDUSTRIAL CHEMIST

By T. L. Cottrell

Professor T. L. Cottrell, formerly personal assistant to Sir Ewart Smith and now Professor of Chemistry at Edinburgh University, raised in his recent inaugural lecture the lively question: Why is the industrial inorganic chemist less competent than he might be? His opinions are of course purely personal, and this statement of the qualities needed by an industrial chemist should not be construed as a criticism of any particular body of chemists within I.C.I.

MY main personal impression (said Professor Cottrell, after pointing out that approximately 64% of qualified chemists are employed in industry) is that the most striking characteristic of the chemist in industry is his lack of professional competence.

Let me be more specific about the respects in which I believe the chemist is less competent than he might be. The first is that when faced with a problem of a type he has not met before he resorts to the purest empiricism, untinted by chemical theory. It is as if he had decided that the chemical theory he had spent four years in acquiring was all very well in the lecture room but of no use in the serious practical world of chemical industry. For him an education in chemical theory is equivalent to the education in Latin that the chemist attending some universities in England must have undergone: something to be endured for the sake of getting a degree and to be forgotten as soon as the paper qualification is achieved.

The next and perhaps even more important defect, of which I must admit to having been guilty myself, is an insufficiently critical and enquiring attitude to the research problem. Vast amounts of money are poured down the drain in the investigation of problems which do not require solution.

A simple example is the following. The chemist who is responsible for the chemical side of a process is asked by the engineer, who is concerned with providing the cooling, to tell him the specific heat of the reaction mixture. This is not known, and the chemist concerned asks his colleague responsible for making physical measurements to measure the specific heat of a mixture of A and B. This is done, and the answer given to the engineer.

But it is probable that the engineer only wanted it to within let us say 25%, and the first chemist might have known that the specific heats of chemically similar liquids rarely differ nearly as much as this from one another. He might, therefore, have looked up a few figures and given the engineer a value that would be adequately accurate for his purposes. Or the second chemist might have asked how accurately it had to be known. In either case much money would have been saved. Here certainly the ability

to ask the right simple question is vastly more important than the ability to carry out the determination correct to say $\pm 1\%$.

Related to this there is an even more depressing failing: a tendency to do experimental work rather than look up the literature. It is not sufficiently realised that experimentation is a time-consuming and expensive business, which should be resorted to only if it is certain that the result is needed and that it is not already known.

One might say that if the chemist who can make a measurement or carry out an analysis accurately is worth his weight in lead, and the chemist who can improve the method is worth his weight in silver, the chemist who can show that the measurement is not necessary at all is worth his weight in gold. I should perhaps add, in case there is any misunderstanding, that this sort of argument does not apply to the same extent to speculative work in a new field of chemistry, where it cannot be said whether the result will be important until it is obtained.

The third defect is so frequently discussed that it is almost a platitude to mention it: most chemists can't write. The editors of scientific journals bewail the fact frequently. It is admitted by all, but I doubt whether its seriousness is sufficiently appreciated.

These three common defects: the lack of power to apply theory, the lack of a critical approach to the problem in hand, and the inability to communicate clearly, are all aspects of the same thing: the lack of an academic approach. The academic approach to knowledge is critical and theoretical, and essentially concerned with its communication, and these are qualities in which I suggest chemists are deficient. This deficiency has adverse practical consequences. If I am right, we arrive at the apparently paradoxical conclusion that the greatest *practical* defect of the professional chemist is a lack of *academic* intellectual qualities.

Stated thus, my position, I am sure, would not commend itself to many of my former colleagues in industry. On the contrary, they comment that newly graduated chemists are too theoretically inclined: I think that their views are valid but their terminology is wrong.

BURGLARS

By Harold Morris

IT was Thursday night, and I had just completed seven shifts on two to ten. I handed the job over to my relief, bade him a cheery goodnight, and headed for the Time Office. Off duty once again. Two full days at home with the wife and kids.

Having performed the usual routine of clocking out, I got astride my old boneshaker and headed for home. It's a funny thing, when one is homeward bound, with two days' vacation in the offing, one readily forgets those hectic moments when things have gone wrong in the home and tempers have reached breaking point, when rolling pins have been brandished and flying saucers have whizzed past one's head at speed, not being by any means from outer space, either. You put the old boneshaker in top gear and just mutter to yourself, "Ah well, the world is sweeter than before!"

The head might be a little sore, having come in contact with the wooden implement the wife's mother gave us for a wedding present, but then you pass it off with a grin. Rounding the bend I eagerly looked for the welcome sight of a lighted window, and pictured with pride the old familiar scene within those walls. Three boys, bathed and put to bed. Six-shooters and bows and arrows put away for another day. Three bundles of mischief tucked between the blankets, dreaming of all the Indians they have shot in the mighty battle that raged under the table and behind the settee. Dreaming of the sheriff who threatened to jail them for shooting up the town.

Putting the old boneshaker in the shed, I entered the house, to be met with the enchanting odour of something cooking. A big kiss from the wife and a "Come along, darling, your slippers are warming." Oh boy, home once again! Supper for two is served, and while I growl at a very tough chop the wife enlightens me of the day's happenings. The lads had been little hellcats as usual, and that photograph of the wife and me that used to be on the sideboard isn't there any more.

It seems that the youngest boy thought that I resembled one of his Indians, and boldly drew his

bow, took careful aim and fired, scattering me, the wife and several pieces of broken glass all over the place. The wife, while telling me all this, appeared to be a little agitated, thinking, no doubt, that I would be going off the deep end.

But who cares? What's a photograph, anyway? We see each other's mugs every day, three hundred and sixty-five days a year, and after twelve years, well—what the hell! Supper over, and the piece of rhino safely inside the inner man, I grabbed the evening paper. Lighting a cigarette, I settled down to read. Bank robberies, smash and grab, bag-snatching, somebody flogging a copper—all the usual activities of this hard and cruel world.

The wife begins to put her curling pins in, steel prodders, I call 'em. When one is sleeping soundly and one suddenly gets butted with a headful of these things—well, it could cause a row. Ah well, the eldest lad has chopped the firewood, the milk bottle is reposing on the step, all doors are locked and barred. So, bleary eyed, I stagger aloft to bed.

The land of dreams at last! But alas, this pleasant and well-earned rest was not to be mine for long, for I suddenly woke up with a start. Something somewhere had disturbed me. I could hear the wife breathing heavily. She was sleeping soundly, so I hadn't been gored with a headful of curling pins. I sat up in bed and listened.

Yes, there it was again. Someone was moving about downstairs. So that was it—we had burglars! I thought of the kids, and the things I'd read about in the papers. Somewhere downstairs a desperate man was lurking—it couldn't possibly be anything else. We didn't have a cat or a dog, so that wasn't the cause of the noise I had heard. It must be a burglar! I slipped quietly out of bed and put on a pair of trousers over my pyjamas.

Feeling for my torch, I moved stealthily across the room. Opening the bedroom door, I listened carefully. Yes, there it was again, but this time the noise



... "This fellow meant business. He was obviously going to do his very best to deliver the first blow."

was a very familiar one—that of rattling crockery. The cheeky blighter! He wasn't satisfied with appropriating some of our worldly goods, he was brewing up as well. I'll give him a brew! A good fifteen stone behind a right piledriver, and he'll cease to take any further interest in the time-worn art of pilfering.

I tiptoed out on to the landing. Blast it, that second step always did creak! Must have it seen to. I stood rigid, gripping the banister rails. The pantry door went click. Blimey, he's flogging the biscuits! I'll give him biscuits, the lousy, lowdown —. But cussing wouldn't help. This lot called for action. Showing a light was out of the question. He was bound to see it, and then he'd make a dash for it.

Slowly I began to descend the stairs. Twelve steps.

I started to count. One false step, and I'd take a header. I wanted to be all in one piece when I came face to face with our friend from the underworld. By the time I'd reached the ninth step I could see a light shining beneath the door leading into the front room. So that's where he is, I muttered to myself. I almost jumped the last three steps.

Gripping the door handle, I flung it open. There he was, as cool as a cucumber, stood on the hearthrug with his back to the fire, drinking tea and eating biscuits. He looked me full in the face, yet didn't seem to realise I was there. The budgie had suddenly come to life, due to the unusual activity in the early hours, and began to talk. "Pretty boy, beauty," he chirped. I looked hard at our friend from the

underworld. Some pretty boy, he was. Pug nose and cauliflower ears were only two of the things of which he could boast. This, coupled with an unshaven face, hands as big as a shovel, and standing six foot four, made him look like a giant. This fellow was going to take some handling. Taking another bite of his biscuit, he looked at me again. Then it happened. Like a shot from a cannon, he flung the teacup. I felt the wind of it as it flew past my head. No sooner had he done this than he decided on a more strategic move—he grabbed the poker. Armed with an implement like that, a man can do a lot of damage. I know. I've been on the receiving end when the wife's been armed with that thing, and believe me, it's no joke.

There he stood, tight-lipped, and a look of grim

determination on his face. This fellow meant business. He was obviously going to do his very best to deliver the first blow, and that's the one that counts in mortal combat.

I stood in the doorway, body tense, fists clenched. I juggled with the idea of charging him. Then I remembered the telly in the corner. If we both crashed into that precious instrument of pleasure the wife would have me arrested as well as the burglar. I began to move stealthily to the left and behind the table. This prompted him to move in the opposite direction. Just what I wanted—he was moving away from the telly. I quickly looked round for something heavy to put me on even terms with him, but failed to see anything suitable. I thought of the clock on the sideboard. The one with the Westminster chimes. Hell, no—I daren't throw that! Better to let him escape with whatever he had in his pockets. He was now backing towards the door where I had stood a few minutes earlier. Once he got there, he could dash through the kitchen and out of the back door.

By this time I'd managed to get round the table and take up his previous position on the hearthrug. He looked quickly over his shoulder at the open doorway. "Oh no you don't, you donkey!" I shouted, and charged. This sudden rush took him unawares, and we crashed on to the kitchen floor with a terrific thud, with me on top.

I sat on his belly and grabbed at his throat, pressing with all the strength I could muster. His mouth opened wide and his tongue began to protrude. His face began to go purple and his eyes stuck out like organ stops. Then it happened. *Crash. Wallop. Bang.* I got it full in the face—one hell of a smack. I put both hands over my face and shook my head from side to side. I was badly shaken and dazed. It seemed like a year before I managed to open my eyes. I looked round bewildered. There was the wife sat up in bed, grinning like a Cheshire cat.

"You've been throwing yourself all over the bed this last ten minutes," she said, "but when you tried to strangle me I thought it was high time to butt you with a headful of curling pins."

I looked at her sheepishly.

"No more chops for supper, my lad!" she muttered. "They give you nightmares."



"The Mermaid," Copenhagen

Photo by H. B. James (Plant Protection Ltd.)